Space Weather Forecast

Issued on Thursday, 25 January 2024 at 12:54 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: CME (Coronal Mass Ejection) arrivals possible later 25 January into early 26 January, with Minor geomagnetic storming likely and a chance of Moderate storms. Moderate solar activity likely.

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Solar activity has been Moderate with one Moderate-class flare at 24/2058 UTC, from a region in the southwest. This region is displaying some minor decay in areal extent recently, although this could be due to its increasing proximity to the limb, which is starting to make assessing the magnetic structure more difficult. There is another region situated very close to this which makes it difficult to determine the separation, and these could be considered one region. Another larger region in the northwest has magnetic complexity, perhaps now breaking down, and appears to be slowly losing area. The remaining spot regions are small and simple at present.
There have been several Coronal Mass Ejections (CMEs) emerge in the last 24 hours, none of which are thought likely to be Earth directed.

Solar Wind / Geomagnetic Activity: Solar winds showed waning weak fast winds, followed by a weak CME arrival around 25/0537 UTC. Wind speeds were mostly at slightly elevated levels, between 380-460 km/s. Total magnetic field strength has been weak, with the north-south component varying mostly weakly, especially after the CME arrival. Geomagnetic activity was Quiet throughout (Kp 0-1).

Energetic Particles / Solar Radiation: Solar radiation was at background levels.

Four-Day Space Weather Forecast Summary
Solar Activity: Activity has declined over the last day or so, but is expected to be Low to Moderate with a chance of further isolated Moderate flares and a slight chance of a Strong flare.

Solar Wind / Geomagnetic Activity: There is potential for at least three CME glancing blows in the coming days. In addition, these CMEs are all expected at a similar time - from later on Day 1 (25 Jan) to early on Day 2 (26 Jan), with the potential for them to either combine or arrive one after the other, perhaps increasing any geomagnetic effects.
Overall, geomagnetic activity is expected to be mostly Quiet to Unsettled initially, with an increase expected later Day 1 into Day 2, perhaps step-wise if the various CMEs arrive separately, with Active to G1/Minor Storms likely and a chance of G2/Moderate Storms. There is a slight chance of G3/Strong Storms, should the CMEs combine favourably for this to occur. Geomagnetic activity should then gradually return to Quiet levels by Day 4 (28 Jan) after any residual CME effects have waned.

Energetic Particles / Solar Radiation: There is a slight chance of S1/Minor radiation storms through the period due to the two complex regions on the disc.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	50	70	20	1
Strong	G3	No	5	15	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	50	50	50	50
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	15	15
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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